

## **REMARKS**

Reconsideration and allowance of the subject application are respectfully requested. Claims 1-8, 10-12, 14-15, 18, 20-24 and 26-35 are pending.

Claims 1, 13 and 28 are independent.

During an informal telephonic interview with the Examiner on April 25, 2005, the Examiner indicated that while claim 13 was indicated as allowable in the previous office action, this claim was indicated as allowable by virtue of its dependency on dependent claim 10. As such, the Examiner indicated that incorporating claim 13 into the independent claims does not, prima facie, place these claims in condition for allowance. Applicants requested an opportunity to submit supplemental arguments in support of the allowability of the independent claims. On April 27, 2005, the Examiner indicated that a supplemental response would be permitted. Accordingly, applicants provide the following supplement remarks.

Claims 1-6, 9, 15-21 and 27-29 stand rejected under 35 U.S.C. 102(b) as being anticipated by Hartley (USP 5,903,664). Applicants respectfully traverse.

Hartley teaches a cardiac segmentation system. The system acquires a series of images as slices through a volume. The images are typically taken at different time periods throughout the cardiac cycle. To segment the data in order to isolate certain structures, such as blood volume in the left ventricle, the system performs region growing about a seed point. The process begins with the user defining a region of interest in one of the two-dimensional

images. For example, the user may define a rectangle or other polygon within the image that includes the desired feature such as the left ventricle. The user then selects a seed point within the region of interest that they have defined. The system then performs region growing around the seed point based upon a threshold. The region growing is only performed within the defined region of interest. However, the user may interactively adjust the threshold setting (see col. 4, line 13). Once the user is satisfied with the threshold setting and the resulting segmented region displayed within the user defined region of interest in the two-dimensional image, the system automatically performs the segmentation operation on each image in the series of images.

The automated segmentation performed by the system of Hartley involves calculating a threshold update based upon an analysis of a histogram calculation using the segmented region and a set of pixels just outside the segmented region. The adjusted threshold is then used as a threshold on the next adjacent image. A seed point within the next adjacent image is determined based upon a calculated centroid of the previous segmented region. Accordingly, the system of Hartley steps through a set of image slices and determines a two-dimensional segmented region in each image using threshold based region growing.

The system and method of Hartley are aimed at the problem of using a fixed seed point and threshold for all images in a cardiac scan, where the series of images are taken at different periods throughout the cardiac cycle. The differences from slice to slice may be relatively small, but the differences over

the whole series of images can be significant and result in poor segmentation. Accordingly, Hartley teaches that the threshold-based growing region, which is performed in two dimensions within each image slice independently, should be adjusted for each slice based upon the segmented region arrived at in the previous slice.

By contrast, the independent claims of the subject application, for example claim 1, recite "determining a seed point in the volume defining array in response to the selection by the user of a pixel in the view of the volume being displayed." Further in contrast to Hartley, the independent claims recite such as in claim 1, "growing a region in three dimensions about the seed point."

Accordingly, as demonstrated above, Hartley neither discloses nor suggests the subject matter recited in the independent claims, and therefore, for at least these reasons, cannot anticipate or render claims 1-6, 9, 15-21 and 27-29 obvious to one skilled in the art.

Applicants respectfully request that the Examiner withdraw this art grounds of rejection.

## **CONCLUSION**

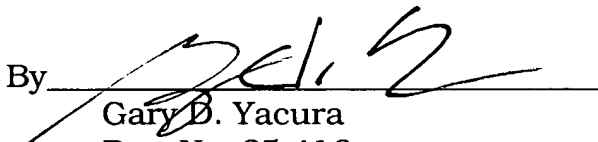
In view of above remarks, reconsideration of the outstanding rejection and allowance of the pending claims is respectfully requested.

If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at number listed below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

HARNESS, DICKEY & PIERCE, PLC

By   
Gary D. Yacura  
Reg. No. 35,416

GDY:jcp

P.O. Box 8910  
Reston, VA 20195  
(703) 668-8000